

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

1. (CANCELLED)

2. (CANCELLED)

3. (PREVIOUSLY PRESENTED) An apparatus for controlling a linear compressor, comprising:

a collision detection unit detecting a collision of a piston with a valve due to operations of the linear compressor;

a control unit determining whether the collision of the piston occurs based on an output signal from the collision detection unit; and

a compressor driving unit controlling a maximum amplitude of the piston of the linear compressor under a control of the control unit,

wherein the collision detection unit includes:

a bridge unit having first and second coils serially connected to a ground, and first and second resistors connected in parallel with the first and second coils and serially connected to each other;

a core linearly reciprocating by penetrating the first and second coils according to a movement of the piston of the linear compressor and made of a magnetic substance;

a sine wave generating unit providing a sine wave to the first resistor and the first coil;

first and second half-wave rectifying units, each comprising a diode half-wave rectifying an output signal from a junction of the first and second resistors, and an output signal from the junction of the first and second coils, respectively;

a differential amplifying unit differentially amplifying output signals from the first and second half-wave rectifying units;

a low pass filter removing a high frequency component of an output signal from the differential amplifying unit; and

a peak detection unit detecting a peak of an output signal from the low pass filter, and outputting a detected result to the control unit.

4. (PREVIOUSLY PRESENTED) The apparatus according to claim 3, wherein the peak detection unit includes:

- a diode half-wave rectifying the output signal from the low pass filter;
- a third resistor serially connected to an output terminal of the diode;
- a capacitor connected between an output side of the third resistor and ground to perform a smoothing operation; and
- a fourth resistor connected between the output terminal of the diode and the ground.

5. (PREVIOUSLY PRESENTED) An apparatus for controlling a linear compressor with a core, comprising:

- a collision detection unit detecting a collision of a piston with a valve due to operations of the linear compressor;
- a control unit determining whether the collision of the piston occurs based on an output signal from the collision detection unit;
- a compressor driving unit controlling a maximum amplitude of the piston of the linear compressor under a control of the control unit;
- a differential amplifying unit differentially amplifying output signals according to a detected position of the core;
- an amplitude calculation unit calculating an amplitude of the piston based on an output signal from the differential amplifying unit, and providing the calculated amplitude to the control unit; and
- a displacement calculation unit calculating a displacement of the piston according to a calculation result from the amplitude calculation unit, and providing the calculated displacement to the control unit.

6. (CANCELLED)

7. (CANCELLED)

8. (CANCELLED)

9. (CANCELLED)

10. (CANCELLED)

11. (PREVIOUSLY PRESENTED) An apparatus for controlling a linear compressor with a piston and a valve, comprising:

a detection unit detecting a collision of the piston with the valve during operation of the linear compressor according to at least a peak amplitude of the piston;

a control unit determining whether the collision of the piston occurs based on an output signal from the detection unit; and

a compressor driving unit controlling a maximum amplitude of the piston according to output signals from the control,

wherein the detection unit comprises

a bridge circuit having first and second coils serially connected at respective first terminals of the first and second coils, and first and second resistors connected in parallel with the first and second coils and serially connected to each other at respective first terminals of the first and second resistors,

a core linearly reciprocating by penetrating the first and second coils, a position of the core corresponding to a position of the piston of the linear compressor and magnetically coupling with the first and second coils,

a sine wave generating unit energizing the bridge circuit at second terminals of the first and second coils, respectively,

first and second rectifying units connected to the respective first terminals of the first and second coils and the respective first terminals of the first and second resistors, respectively to rectify output signals thereof,

a differential amplifying unit differentially amplifying output signals from the first and second rectifying units,

a low pass filter removing a high frequency component of an output signal from the differential amplifying unit, and

a peak detection unit detecting a peak of an output signal from the low pass filter, and outputting a detected result to the control unit.

12. (CURRENTLY AMENDED) An apparatus for controlling a linear compressor with a piston and a valve, comprising:

a detection unit detecting a collision of the piston with the valve during operation of the linear compressor according to at least a peak amplitude of the piston;

a control unit determining whether the collision of the piston occurs based on an output signal from the detection unit; and

a compressor driving unit controlling a maximum amplitude of the piston according to output signals from the control,

wherein the detection unit comprises

a position detection circuit detecting a position of a core by a differential signal provided by first and second coils when the core is linearly reciprocating by ~~penetrating~~passing back and forth relative to the first and second coils and the first and second coils are excited by an external source,

a low pass filter removing a high frequency component of the differential signal, and

a peak detection unit detecting a peak of the differential signal output from the low pass filter, and outputting a detected result to the control unit.,

wherein the peak detection unit comprises:

a diode rectifying the output signal from the low pass filter,

a resistor serially connected between an output terminal of the diode and an output of the peak detection unit,

a capacitor connected between an output side of the resistor and a first voltage level to smooth the output of the peak detection unit, and

a second resistor connected between the output terminal of the diode and the first voltage level, and

the position detection circuit produces the differential signal proportional to a change in the position of the core by magnetic coupling between the core and each of the first and second coils.

13. (CANCELLED)

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21. (CANCELLED)

22. (CURRENTLY AMENDED) A method of controlling a linear compressor with a piston, a valve and a control unit, comprising:

detecting a collision of the piston with the valve according to at least a peak amplitude of the piston;

determining whether the collision of the piston occurs based on at least the peak amplitude of the piston; and

controlling a maximum amplitude of the piston to prevent a further collision according to the determining of whether the collision of the piston occurs, wherein the detecting comprises:

detecting a position of a core by a differential signal provided by first and second coils when the core is linearly reciprocating by penetrating the first and second coils and the first and second coils are excited by an external source,

removing a high frequency component of the differential signal,

detecting a peak of the differential signal after the high frequency component is removed, and

outputting a detected result to the control unit,

wherein the detecting of the peak comprises:

rectifying the differential signal after the high frequency component is removed,

and

smoothing the rectified differential signal, and

the detecting produces the differential signal proportional to a change in the position of the core by a magnetic coupling between the core and each of the first and second coils.

23. (CANCELLED)

24. (CANCELLED)

25. (CURRENTLY AMENDED) The method according to claim 2422, wherein the detecting comprises:

differentially amplifying output signals according to a detected position of the core;

calculating an amplitude of the piston based on the differentially amplified output signals;

calculating a displacement of the piston according to the calculating of the amplitude;

and

outputting the calculated amplitude and the calculated displacement.

26. (PREVIOUSLY PRESENTED) The method according to claim 25, further comprising:

preventing the collision of the piston with the valve by controlling the displacement of the piston and/or the amplitude of the piston by results of the detecting of the position of the core.

27. (CANCELLED)